

Notice of Allowability

Application No.

10/687,131

Examiner

Allen C. Ho

Applicant(s)

DU ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed on 10 June 2005.
2. ☒ The allowed claim(s) is/are 1-5,8-12,15-19 and 22-25.
3. ☒ The drawings filed on 16 October 2003 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 08/12/05
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Patrick S. Yoder (Reg. No. 37,479) on 12 August 2005.

The application has been amended as follows:

Paragraph [0041], line 5, "energies." has been replaced by --energies at 302--.

Claim 8 has been amended as follows:

8. (currently amended) A method for analyzing materials in an object, said method comprising:

acquiring x-ray projection data of the object at high energy and at low energy for a plurality of views;

utilizing the acquired x-ray projection data in a material decomposition to determine material densities at each pixel for two selected basis materials;

utilizing a determined mapping of material density regions for the two selected basis materials, filtering pixels of an image of the object corresponding to one or more compositions of interest; and displaying an image indicative of the locations of composition of interest of the object;

wherein said selected materials are predetermined, ~~said~~ and wherein the method further comprises determining a composition of an object at each pixel utilizing a predetermined

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mapping of material density regions for the two preselected materials ~~comprises~~by determining which of a plurality of rectangular regions in a Cartesian coordinate system contains said determined material densities, and selecting the determined composition in accordance with said determined rectangular region or determining a ratio of said determined material densities, and selecting the determined composition in accordance with said ratio.

Allowable Subject Matter

2. Claims 1-5, 8-12, 15-19, and 22-25 are allowed.
3. The following is an examiner's statement of reasons for allowance:

With regard to claims 1-5, although the prior art discloses a method for analyzing materials in an object comprising the steps of utilizing acquired x-ray projection data in a material decomposition to determine material densities at each pixel for two selected basis materials and determining a composition of an object at each pixel utilizing a determined mapping of material density regions for the two selected basis materials, it fails to teach or fairly suggest that the step of determining a composition comprises determining which of a plurality of rectangular regions in a Cartesian coordinate system contains the determined material densities, and selecting the determined composition in accordance with the determined rectangular region, or determining a ratio of the determined material densities, and selecting the determined composition in accordance with the ratio as claimed.

With regard to claims 8-12 and 15, although the prior art discloses a method for analyzing materials in an object comprising the steps of utilizing acquired x-ray projection data in a material decomposition to determine material densities at each pixel for two selected basis

materials, utilizing a determined mapping of material density regions for the two selected basis materials, and filtering pixels of an image of the object corresponding to one or more compositions of interest, it fails to teach or fairly suggest that the method further comprises a step of determining a composition of an object at each pixel utilizing a predetermined mapping of material density regions for the two preselected materials by determining which of a plurality of rectangular regions in a Cartesian coordinate system contains said determined material densities, and selecting the determined composition in accordance with said determined rectangular region, or determining a ratio of said determined material densities, and selecting the determined composition in accordance with said ratio as claimed.

With regard to claims 16-19, although the prior art discloses an apparatus comprising means for determining a composition of an object at each pixel utilizing the computer and a determined mapping of material density regions for the two selected basis materials in the storage device, it fails to teach or fairly suggest that the means for determining is configured to determine which of a plurality of rectangular regions in a Cartesian coordinate system contains the determined material densities, and to select the determined composition in accordance with the determined rectangular region, or determine a ratio of the determined material densities, and to select the determined composition in accordance with the ratio as claimed.

With regard to claims 22-25, although the prior art discloses an apparatus comprising means for processing acquired x-ray projection data utilizing a computer and a storage device to determine material densities at each pixel for two selected basis materials, and means for utilizing the computer and a determined mapping of material density regions for the two selected basis materials in the storage device to filter pixels of an image of the object corresponding to

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one or more compositions of interest, it fails to teach or fairly suggest that the means for utilizing the computer and determined mapping of density regions for the two selected basis materials is configured to determine which of a plurality of rectangular regions in a Cartesian coordinate system contains the determined material densities, and to select the determined composition in accordance with the determined rectangular regions, or determine a ratio of the determined material densities, and to select the determined composition in accordance with the ratio as claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


- (1) Avinash *et al.* (U. S. Patent No. 6,898,263 B2) disclosed a method and apparatus for soft-tissue volume visualization.
- (2) Reddy *et al.* (U. S. Patent No. 6,836,528 B2) disclosed a method and apparatus for detecting structural, perfusion, and functional abnormalities.
- (3) Sabol *et al.* (U. S. Pub. No. 2004/0101088 A1) disclosed a method and apparatus for discriminating multiple contrast agents.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Allen C. Ho
Primary Examiner
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12 August 2005